

REAL TIME CLOCK MODULE (I²C-Bus)

For Automotive

Built-in 32.768 kHz-DTCXO, High Stability and Power Switching

RA 8900 SA/CE



Product Number (Please contact us)

RA8900SA: X1B000282Axxx00

RA8900CE: X1B000271Axxx00

- Built in frequency adjusted 32.768 kHz crystal unit and DTCXO.
- Interface Type : I²C-Bus interface (400kHz)
- Interface voltage range : 2.5 V to 5.5 V
- Temp. compensated voltage range : 2.0 V to 5.5 V
- Clock supply voltage range : 1.6 V to 5.5 V
- Selectable clock output (32.768 kHz, 1024 Hz, 1 Hz)
- The various functions include full calendar, alarm, timer, temp. sensor function.
- Applications : Car audio, Car navigation system, Clock
- Conforms to AEC-Q200
- *The I²C-BUS is a trademark of NXP Semiconductors.



RA8900SA
(10.1 × 7.4 × 3.3 mm)



RA8900CE
(3.2 × 2.5 × 1.0 mm)

Actual size

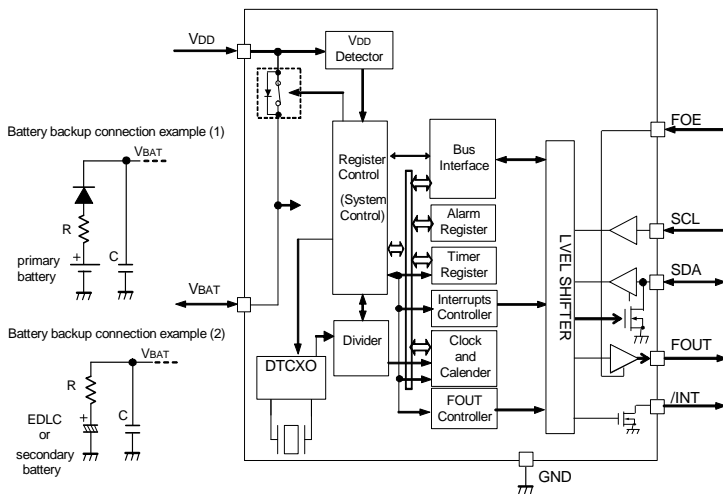
RA8900SA



RA8900CE



Block diagram



Overview

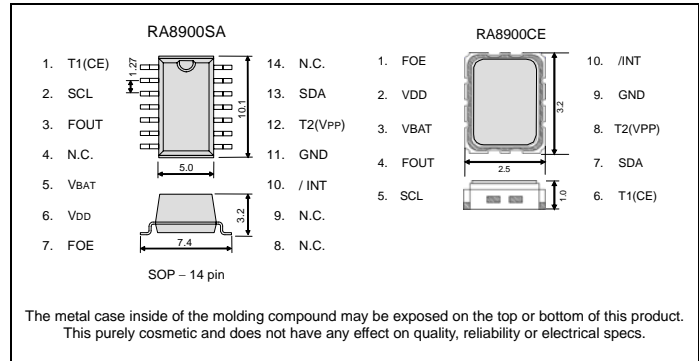
- **High Stability**
 - UA ± 3.4 × 10⁻⁶ / -40 °C to +85 °C (Equivalent to 9 seconds of month deviation)
 - UB ± 5.0 × 10⁻⁶ / -40 °C to +85 °C (Equivalent to 13 seconds of month deviation)
 - UC ± 5.0 × 10⁻⁶ / -30 °C to +70 °C (Equivalent to 13 seconds of month deviation)
- **32.768 kHz frequency output function**
 - FOUT pin output (C-MOS output), CL=30 pF
 - Output selectable: 32.768 kHz, 1024 Hz, 1 Hz
- **Available automatic battery backup switch-over function**
 - Charge from VDD to backup battery connected to VBAT is possible. VDD voltage drop (VDET3) detection and automatically switches to the backup battery. This circuit is optimal to backup with a secondary battery and a large capacitor.
- **Timer function**
 - Timer function can be set up between 1/4096 second and 4095 minutes.
- **Alarm function**
 - Alarm function can be set to day of week, day, hour, and minute.
- **Temp. sensor function**
 - The temperature data are output to a register by a temp. sensor function. (Bank.2_Add17h)

Pin Function

Signal Name	I / O	Function
T1(CE)	input	Use by the manufacture for testing. (Do not connect externally.)
SCL	input	Serial clock input pin.
FOUT	Output	The pin outputs the reference clock signal. (CMOS output)
VBAT	-	Battery supply. This pin has charge capability to backup battery.
VDD	-	Connected to a positive power supply
FOE	input	The input pin for the FOUT output control.
/INT	Output	Interrupt output (N-ch. open drain).
GND	-	Connected to a ground
T2(VPP)	-	Use by the manufacture for testing. (Do not connect externally.)
SDA	I/O	Data input and output pin.

Terminal connection / External dimensions

(Unit:mm)



Specifications (characteristics)

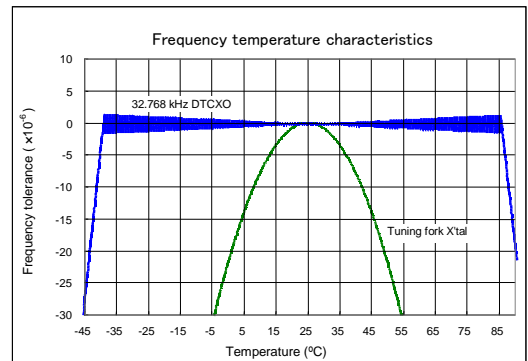
* Refer to application manual for details.

■ Electrical Characteristics

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Operating voltage	V _{DD}	Interface voltage	2.5	3.0	5.5	V
Temp. compensated voltage	V _{TEM}	Temp. compensated voltage	2.0	3.0	5.5	V
Clock supply voltage	V _{CLK}	Internal clock	1.6	3.0	5.5	V
Operating temperature	T _{OPR}	No condensation	-40	+25	+85	°C
Stability	Δf/f	UA	Ta = -40 °C to +85 °C		±3.4 *1	× 10 ⁻⁶
		UB	Ta = -40 °C to +85 °C			
		UC	Ta = -30 °C to +70 °C			
Current consumption (1)	I _{DD1}	fSCL=0Hz, /INT=V _{DD} , FOE=GND, V _{DD} =V _{BAT}	-	0.72	1.5	μA
Current consumption (2)	I _{DD2}	FOUT: OFF, Temp. Compensation interval 2.0 s.	-	0.70	1.4	

*1) Equivalent to 9 seconds of month deviation. *2) Equivalent to 13 seconds of month deviation.

■ 32.768 kHz-DTCXO Frequency temperature characteristics (Example)



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At Seiko Epson, all environmental initiatives operate under the Plan-Do-Check-Action (PDCA) cycle designed to achieve continuous improvements. The environmental management system (EMS) operates under the ISO 14001 environmental management standard.

All of our major manufacturing and non-manufacturing sites, in Japan and overseas, completed the acquisition of ISO 14001 certification.

ISO 14000 is an international standard for environmental management that was established by the International Standards Organization in 1996 against the background of growing concern regarding global warming, destruction of the ozone layer, and global deforestation.

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	► Pb free.
	► Complies with EU RoHS directive. *About the products without the Pb-free mark. Contains Pb in products exempted by EU RoHS directive. (Contains Pb in sealing glass, high melting temperature type solder or other.)
	► Designed for automotive applications such as Car Multimedia, Body Electronics, Remote Keyless Entry etc.
	► Designed for automotive applications related to driving safety (Engine Control Unit, Air Bag, ESC etc).

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